ARCH 492  | Environmental Control Systems II

COURSE: ARCH 492 – Spring 2009
CRN: 30850
4 credit hours; one of two required ECS courses for architecture students

INSTRUCTOR: Adjunct Professor Kristen DiStefano

LECTURES: Tuesdays and Thursdays: 2:00 – 3:20PM, 177 Lawrence

LABS: 8 discussion sections will be held on
Tuesday, Wednesday, Thursday, at various times and locations
(see DuckWeb for details and options)

TEXT/MATERIALS: Required: Mechanical and Electrical Equipment for Buildings, 10th edition
In Praise of Shadows

Strongly Recommended:, Green Studio Handbook, (Kwok and Grondzik),
Sun, Wind & Light: Architectural Design Strategies, 2nd edition
(G.Z. Brown and M. DeKay);

PREREQUISITES: Recommended: college physics; open to non-majors.

GRADING: 491 EITHER GRADED OR P/N
Undergraduate Students: PASS requires minimum equivalent grade of C-
Graduate Students: PASS requires minimum equivalent grade of B-
BACKGROUND
This course provides a fundamental overview of complex environmental issues that are integral to the architectural discipline. Although these issues are stated in a technical (easily calculated) way, they carry with them significant sensory implications and opportunities for the ways in which people interact and respond to architectural works. In this course we will emphasize the senses of sight (light), hearing (acoustics), and taste (water supply). An in-depth knowledge about the technical characteristics of light, sound, and water use allows one to quantify, measure and minimize the environmental impact of a building while taking care to limit (or eliminate) its consumption of natural resources. It also allows one to carefully construct the sensory aspects of building design that are fundamental to the ways in which buildings are occupied and experienced. This is the second term of a two-term course designed to help you test and improve your designs through an understanding of the above ECS criteria.

OBJECTIVES
To develop a clear understanding about the relationship between the perception of space and the technical aspects that quantify its design. This course is intended to teach students about daylight, electric lighting, acoustics, and water systems in order to encourage educated decisions about a building’s internal environment and its environmental impact. This design-centered course will allow students to immediately apply and test the subject matter in order to find solutions that encourage consideration of occupants and environmental responsibility in design.

INSTRUCTIONAL OBJECTIVES
The following instructional objectives follow the "1998 Guide to Student Performance Criteria" (37 criteria based upon an integrated approach to architectural education) distributed by the National Architectural Accrediting Board. The objectives of this course are to: understand the basic principles that form the design of environmental systems, strongly emphasizing the following Student Performance Criteria: (4) Research Skills; (7) Collaborative Skills; (11) Use of Precedents; (12) Human Behavior: Understanding of the theories and methods of inquiry that seek to clarify the relationship between human behavior and the physical environment; (15) Sustainable Design: Understanding of the principles of sustainability in making architecture and urban design decisions that conserve natural and built resources, including culturally important buildings and sites, and in the creation of healthful buildings and communities; (17) Site Conditions; (19) Environmental Systems: including acoustical, lighting, and climate modification systems, and energy use, integrated with the building envelope; (21) Building Envelope Systems; (22) Building Service Systems; (23) Building Systems Integration; (24) Building Materials and Assemblies; (26) Technical Documentation

LEARNING VEHICLES
In addition to weekly quizzes based upon lectures and assigned readings, each student will participate in a weekly discussion/lab section. Homework assignments will consist of application based projects related to daylighting design and testing, luminaire design and construction, acoustic renovations and water reuse and conservation. In-section exercises will involve activities/calculations that develop a better understanding of the concepts and principles of these topics.

COURSE ACTIVITIES
Lectures will include:
Discourse about the connections between a building’s performance characteristics, climate response, and the architectural design decisions that influenced them. This course promotes critical thinking.
Lab sections will include:
Exercises that help to elaborate on principles and concepts from lecture;
Opportunities to develop inquiry questions, hypotheses ("hunches"), and methodologies for gathering information for a series of case-study-based projects;
Field investigations during building visits on various topics (e.g. lighting levels, energy use, glare, etc.), comparing results to design intent, various standards and codes.

FINAL EXAMINATION PERIOD: June 9, 2009
EVALUATION
Course grades will be based on quizzes, homework projects, in-class exercises, participation and attendance.